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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,549	12/10/2001	Yhean-Sen Lai	LAI 20-7	6285
7590 04/27/2005				
Stephen J. Weed Synnestvedt & Lechner LLP 2600 ARAMARK Tower 1101 Market Street Philadelphia, PA 19107-2950		EXAMINER JAMAL, ALEXANDER		
		ART UNIT PAPER NUMBER		
		2643		
DATE MAILED: 04/27/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/016,549

Applicant(s)

LAI ET AL.

Examiner

Alexander Jamal

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7-10,12,14-15,17-20 is/are rejected.
- 7) ☒ Claim(s) 4,6,11,13 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3-4-2002.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. **Figure 1** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-3,8-10,15,17,18,20** rejected under 35 U.S.C. 102(b) as being anticipated by Younce et al. (IEEE: "Echo Cancellation for Asymmetrical Digital Subscriber Lines", pages 301-306).

As per **claim 1**, Younce discloses a DMT modem with a transmit path including an IFFT circuit and a receive path including an FTT circuit (Fig. 1, page 302). The modem comprises a cyclic echo synthesizer (CES) that produces a cyclic echo signal in the time domain based off of transmitted signal  $x(n)$ . The modem further comprises a first summer (Fig. 1) to add a cyclical echo signal to the receive signal in the time domain (page 303 Col 1 last full paragraph). The modem further comprises frequency domain echo canceller EC (Fig. 1) that adaptively filters the transmit signal  $X(k)$  based upon error signal  $E(k)$  (Pages 303-304 section 2.5). The result of the adaptive filter is added to the receive signal via a second summer. The second summer outputs to a frequency domain equalizer.

As per **claim 8**, claim rejected for same reasons as claim 1 rejection.

Additionally, the modem comprises a transmit encoder (Fig. 1) for the purpose of encoding the data to be transmitted according to the ADSL DMT standard. The modem additionally inherently comprises a receive decoder for the purpose of decoding the received encoded signals according to the ADSL DMT standard. The modem (Fig. 1) performs digital signal processing on the information received by the modem and sends it to/from the analog interface (hybrid) to the ADSL line. As such the modem inherently comprises an A/D converter on the receive path and a D/A converter on the transmit path for the purpose of converting the signals to the appropriate form (ie. either to be processed digitally or transmitted in analog).

As per **claim 17**, claim rejected as a method performed by the device of the claim 8 rejection.

As per **claims 2,9,20**, the modem further comprises a slicer coupled to the output of the frequency domain equalizer and a third summing unit coupled to subtract the slicer output from the slicer input (Fig. 1). Younce further discloses that the slicer error can be inverse frequency equalized and then used to update the adaptive echo canceller (Pages 303-304 section 2.5).

As per **claims 3,10,15,18**, the echo canceller of the modem is adjusted based upon feedback provided by the slicer error signal (as mentioned above). Younce also discloses that the CES must also synchronize it's output based upon the same delay experienced by the echo canceller (Page 303, section 2.3). As such, the CES circuitry inherently comprises an adaptive input (in the same manner as the echo canceller) for the purpose of detecting the feedback signal supplied by the frame alignor (or timing adjustment circuit) (the frame alignor comprising the circuitry at the output of the first summing unit, and also any circuitry used to adaptively drive the echo canceller) so to satisfy the equations 12 (page 303).

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2643

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 5,12,19**, rejected under 35 U.S.C. 103(a) as being unpatentable over Younce et al. (IEEE: "Echo Cancellation for Asymmetrical Digital Subscriber Lines", pages 301-306) as applied to claims 1,8,17 above, and further in view of Betts (5828657).

As per **claims 5,12,19**, Younce discloses applicant's claims 1,8,17, but does not disclose a pilot tone extractor in the time domain with an input for the received signal and outputting a pilot tone cancellation signal.

Betts discloses an echo canceller in a modem (may be wireline: Col 7 line 48 to Col 8 line 6) that comprises notch filter 615 and the controlling part of CPU 630 (Fig. 6) that has an input for the received signal  $r_s(t)$  and an output 682 for a pilot tone cancellation signal. Betts teaches that if the echo canceller (or any other adaptive device) trains in the presence of a pilot signal, the pilot signal may move the received signal into a non-linear range of one of the circuits in the modem (such as the compander) (Col 3 line 35 to Col 4 line 35) and if that occurs then the adaptive device will not train as efficiently as with the pilot tone removed. Since Younce's CES is an adaptive process (used with an echo canceller) that is trained during a training period, it would have been obvious to one of ordinary skill in the art at the time of this application to implement a training signal extraction circuit for the purpose of allowing the CES and echo canceller to optimally adapt to the training signal during the training period in the presence of a pilot tone.

Art Unit: 2643

6. **Claims 7,14**, rejected under 35 U.S.C. 103(a) as being unpatentable over Younce et al. (IEEE: "Echo Cancellation for Asymmetrical Digital Subscriber Lines", pages 301-306) as applied to claims 1,8 above, and further in view of Sih (5307405).

As per **claims 7,14**, Younce discloses applicant's claims 1,8, but does not specify a repeater coupled in between the transmit path and the echo canceller.

Sih discloses an echo canceller with a buffer 154 (Fig. 5) coupled in between the transmit path and an echo canceller. The buffer is a repeater that is used to provide a high impedance (buffer) between the transmit path and the echo canceller. It would have been obvious to one of ordinary skill in the art at the time of this application that any adaptive filter to which the transmit signal is being input to would comprise a buffer (repeater) for the purpose of providing a buffer (non-intrusive impedance) between the output of the transmit encoder and the input to the filter.

### ***Allowable Subject Matter***

7. **Claims 4,6,11,13,16** objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 2643

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

AJ  
April 19, 2005

  
CURTIS KUNTZ  
SUPERVISORY PATENT EXAMINER  
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